

GEOLOGY.—*Taxonomy versus stratigraphy*. DAVID NICOL, Southern Illinois University, Carbondale, Ill.

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Nomenclatural designations should serve to clarify, not obscure, taxonomic relationships, and the practical needs of stratigraphers should in no way hinder this goal. The application of formal nomenclature to every variant in a fossil population is a common practice among stratigraphers, who seek to name each form which has stratigraphic significance; but this practice confounds the true purpose of taxonomy. The problem is well stated by Newell and by Kermack in the symposium on *The species concept in palaeontology*. Newell (p. 66) says:

Morphologic forms artificially extracted from whole populations (e.g., polymorphs, ontogenetic stages, ecotypes, and individual variants) often are given formal Latin names as varieties or species. This action is defended on the grounds that all distinctive fossil forms are actually or potentially indices of stratigraphic horizon, hence deserving of separate recognition. As far as it goes there is some logic in this argument but the point of view on which it is based actually defeats one of the ultimate objectives in stratigraphy, which is the establishment of detailed, interregional fossil zones based on evolutionary development.

And on page 73 Newell reiterates:

It hardly seems appropriate to burden international nomenclature with binominal or trinominal Latin names for categories which at best have only local stratigraphic value and are devoid of evolutionary significance. Yet palaeontologists who favour the naming of artificial categories of scope less than whole populations unconsciously support the limited objectives of local and temporary advantage over the long term goal of world-wide stratigraphic zonation based on evolutionary succession. The individual variants might better be designated, if necessary, by non-Linnaean, vernacular names or numbers.

And Kermack states succinctly (p. 101): "Palaeontology in general suffers from too many species rather than too few."

In general, problems of this sort arise when one is dealing with species which have wide geographic and stratigraphic ranges and have numerous individuals.

The Newell and Kermack contentions are well exemplified and supported by consideration of the species *Glycymeris americana*, which is found from Virginia to Florida from the late Miocene to the Recent. During the latest Miocene this species was exceedingly numerous and variable. The most striking variant is what I have termed the mutant rugose (Nicol, 1953, p. 451). The rugose form was given a species name by Conrad, *quinquerugata*; but Dall (1898, p. 610) and Gardner (1943, pp. 27-28) have synonymized *quinquerugata* with *americana*. Dall (p. 611) thought that the rugose form was due to some pathologic cause.

The earliest specimens of *Glycymeris americana* do not have rugae or folds on the posterior side of the shell, but toward the end of the late Miocene rugose forms began to appear in populations along with normal forms. There is no other consistent difference between normal and rugose forms except for one or more folds or rugae which are located on the outside of the shell and which are nearly always on the posterior side. (Apparently further mutations of some of the rugose mutants gave rise to the rare species *Glycymeris aberrans* at the very end of the Miocene, but this species is of no concern in the present discussion.) Rugose mutants became more and more abundant and spread to populations covering practically the entire geographic range of *Glycymeris americana* until the end of the Miocene, and then they suddenly disappeared. Specimens of *Glycymeris americana* from Pliocene and younger strata never have folds or rugae. There appear to be no geographic or ecologic differences between normal and rugose forms. Collections from late Miocene strata contain both forms in various percentages.

There is no doubt that the rugose forms have stratigraphic significance, certainly more so than the normal forms of *Glycymeris americana*. However, the problem is how to designate the rugose mutant. The

average stratigrapher would prefer a formal Latin name, which, preferably, would have some official nomenclatural standing. From the purely biologic or strict taxonomic view this is unfortunate. I agree with Dall and Gardner that there is no reason to consider the rugose variant as a distinct species. Furthermore, this mutant cannot be considered a subspecies by definition. One could refer to the rugose forms as *Glycymeris americana* variety *quinquerugata*, but I object to this solution for two reasons: (1) There is always the possibility that some paleontologist will unwittingly raise the varietal name to that of a subspecies or a species without at least stating his reasons for doing so. (2) The term or category "variety" is a sort of catchall and really tells us nothing about the variant. My preference, as I stated in 1953, is to term the form *Glycymeris americana*, rugose mutant. If one would prefer in this case, the term "polymorph" can be used instead of "mutant", for *Glycymeris americana* is

certainly a polymorphic species. (Recommended procedure for the term or terms following the species or subspecies name is to set off the description with a comma. However, this is, as yet, not followed by many taxonomists.) Either phrase—"rugose mutant" or "rugose polymorph"—has the advantage of expressing the biologic relationship of the rugose form to the normal form. In this way the stratigraphers can keep the integrity of the variant without confounding its true taxonomic position.

LITERATURE CITED

- DALL, W. H. *Contributions to the Tertiary fauna of Florida, etc.* Trans. Wagner Free Inst. Sci. Philadelphia **3** (4): 521-947, pls. 23-35. 1898.
- GARDNER, JULIA. *Mollusca from the Miocene and Lower Pliocene of Virginia and North Carolina, Part I. Pelecypoda.* U. S. Geol. Survey Prof. Pap. 199-A: 178, 23 pls. 1943.
- NICOL, D. *A study of the polymorphic species Glycymeris americana.* Journ. Pal. **27** (3): 451-455. 1953.
- SYLVESTER-BRADLEY, P. C. (editor). *The species concept in palaeontology.* Systematics Assoc. Publ. 2: 145. London, 1956.

Truth is the foundation and the reason of the perfection of beauty, for whatever stature a thing may be, it cannot be beautiful and perfect, unless it be truly what it should be, and possess truly all that it should have.—ALFRED NORTH WHITEHEAD.